

E-learning pilot project in Transportation Engineering Studies

Dr. Zoltán Létray

Egyetem tér 1.

Győr, Hungary

H-9026

e-mail: letray@sze.hu

Abstract:

In this paper, an e-learning pilot project at the Széchenyi István University will be introduced. This experiment may be the first one in graduate distant learning education, in Hungary. Management of the University has realized that because of the lack of human resources and capacity - while too many applicants - traditional distant learning methods can not cope with today's requirements. Our Goal is the gradual introduction of e-learning technology into the traditional part-time learning:

- *Develop e-learning material (by authoring systems)*
- *Provide students with a Content Delivery System (via internet/intranet)*
- *Run a Learning Management System.*

First, we were thinking about designing and implementing a self-made e-learning framework, but we have realized that the system to be introduced must be:

- *professional, developed by reputed SW companies*
- *widely implemented with good references*
- *continuously evolving and updated*
- *strong in direct support in details, too*
- *integrated with existing "study-management" software-system e.g. "NEPTUN"*

Based upon a Feasibility Study including a detailed analysis of market demands and training specifications, Transportation Engineering Studies has been chosen for the first implementation of our e-learning solution. This education area has great tradition in educating transportation engineers and the University has excellent knowledge and experience in organizing the teaching process.

Relying on our robust and powerful campus computer network infrastructure, the proper IT conditions for the web-based e-learning solution have been elaborated. For those students who lack the necessary computer and internet resources, 'de-centers' with ICT facilities are installed and organized country-wide.

The paper gives an account on a pilot project developed at the Széchenyi István University for the examination of the e-learning model, gaining experiences in organizing, managing, controlling and evaluating CDS and LMS components and practicing in interaction and e-communication with the participants. The pilot project and the investments of the e-learning solution have been sponsored by the Universitas-Győr Kht.

1 Introduction

1.1 Historical background

Ten years ago, a Regional Distant („Part time”) Learning Center had been established at the Széchenyi István University, in Győr. Our Center was the first one, in Hungary. The Aim was to run preparatory courses, 18 higher education institutions were involved. The project was not very much successful, but as a positive side-effect, methods and supplement material had been elaborated.

1.2 Present situation

Recently, we face to problems, like

- too many students, in graduate courses,
- lack of Quality Assurance,
- traditional distant learning methods cannot cope with today’s requirements (e.g. capacity).

Our Goal is the gradual introduction of e-learning technologies into the traditional distant learning: e-learning material (made using authoring systems), Content Delivery System (internet/intranet), Learning Management System, on-line support.

This paper can be viewed as a case study; it simply introduces what we can do based upon the local opportunities, and our technical background.

1.3 Characterizing IT conditions

At the University a high level IT infrastructure is available: 100 Mb/s with GB bones and proper server resources for web-based e-learning solutions. But the general situation in Hungary is different today: there is internet access only in the 20 percents of the families and those are mainly dial-up connections via 30-50 Kbyte/s. Government promises, in three years the 40 percents of the Hungarian families will have internet access. ADSL and Cable LAN are spreading, but availability is limited, recently.

The introduction of an e-learning o-line solution partly depends on the student’s technical opportunities. According to an inquiry, 60% of the students might be able to accommodate PC and internet access for joining e-learning based courses, at the Széchenyi István University.

2 Selection of an e-learning framework

We had to consider the above facts while finding a proper e-learning solution, we think our example is characteristic for this region in Europe, too.

We have examined the “big names” (Learning Space, i-Learning etc.), but we faced problems like

- heavy HW/SW requirements,
- customizing into Hungarian (language and education system) is a hard job, or can be only partly done,
- only “upper” level, “general” support is offered,
- relatively expensive products for an educational institute.

In addition, under the actual application a huge, robust base-SW system must run, and this raises the operating expenses.

2.1 Looking for a Hungarian solution

There are only a few professional e-learning systems, in Hungary. In finding the optimal solution, we have declared some crucial requirements:

- opportunity to influence the requirement specification and functionality (in between development),
- direct (“personal”) help-desk, quick response, intensive support and training at the introduction phase,
- reasonable price for licenses and for the yearly support.

We have examined some Hungarian products and finally, we have chosen the COEDU system of the Mimoza Communication Ltd.

In this paper, we address some aspects of its introduction to a graduate course of the University’s part-time learning offer.

2.2 Introduction of the Coedu system

Coedu system is the most frequented distance learning application used in Hungary; it is equally used in public education, in higher education and in adult education. From this point of view this system can be considered as a quasi standard [1].

2.2.1 The structure of the system

The development of the Coedu project can be divided into four relevant segments:

- 1) As a preliminary specification of the system under development, a methodological foundation serving as a basis of higher and adult distant e-learning had been created.
- 2) An easy to use e-learning material editor client application was created, which can be used for the planning of courses as well as the preparation and testing of courses.
- 3) A content delivery server application, for managing the access rights to content, displaying dynamic content, and compiling reports on the use of the system.
- 4) An educational portal, supporting the interior and exterior communication of e-learning market, providing a fundamental platform between non profit and profit-oriented players on the market, and disseminating a wide range of information concerning systems and learning materials available on the market.

The implementation structure of the system is demonstrated on Fig. 1.

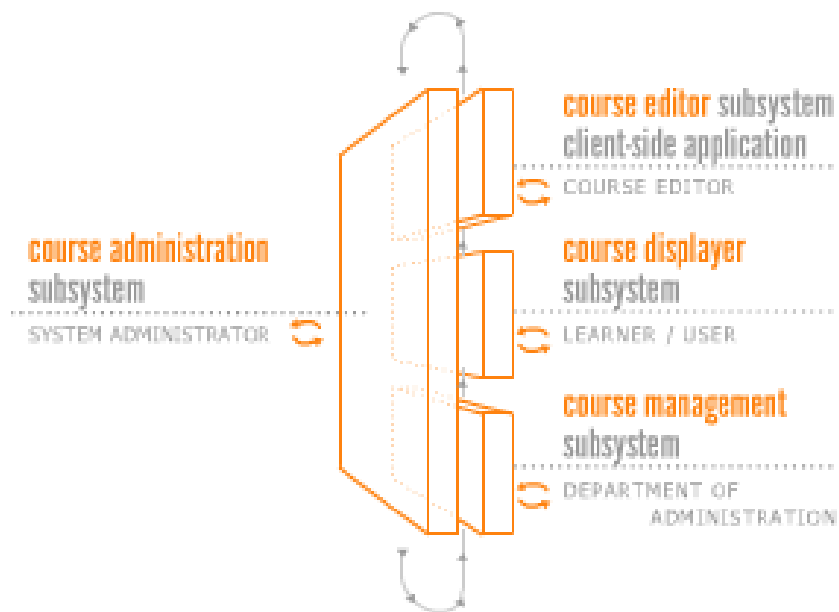


Figure 1. The implementation structure of the Coedu System

Beside the four main components, the system is accessorized by the courses already prepared and the methodology that outlines the designing of further courses and the whole learning management system.

2.2.2 The description of the system

The Coedu distance learning system serves the following functions:

- it is able to handle already existing learning materials, (by means of its XML-based data storage function it is easy to process and to import external data content)
- it is also very easy to retrieve content for further using from Coedu system into another system (the system is currently capable of developing content in internet, intranet, in CD-ROM, and in printed form, but the possible output devices can be simply widened with the help of its XML-based data storage system)
- the system is open, modular, it can be easily widened (the well-levelled architectural setup and the XML-based data management model of Coedu system ensure the open nature and the ability to widen the system easily. The applications on the client's side as well as on the server's side are platform independent.)
- the system is easy-to-use and does not require any preliminary knowledge on part of the student, (Coedu is an easily available possibility for on-line education, as the use of the system only requires a web browser and Internet access. For those who have basic Internet knowledge the system is easy to use.)
- the system is robust and able to serve even a big organization (for the reference client, Government Commission for Information Technology at the Prime Minister's Office the system transacts a training programme with 25 000 learner)
- the system is able to simulate complicated educational processes, and also to map the processes of a big sized organization (Coedu system simulates the realistic educational processes and roles)
- the system is complex with a multilevel access management system (the typical participants of the learning process, the learner, the teacher, the makers of the learning material and the administration department also appears in Coedu system but the educational structures and the access entitlements can be optionally restructured.)
- the system ensures an adequate level of control and feedback mechanism (communication in Coedu system is supported with interactive applications during the learning process, through the chat and forum functions it is easy for the learners and teachers to communicate with each other)

- the system has an easy-to-use learning material-making application (the system disposes own learning material editing application for the creation and publication of the learning material)
- the system contains a methodological commendation supporting electronic distance learning (a unique education technological methodology was created for the support of the system, and users of the system are provided with this)
- the system can be used via internet, intranet, occasional online connection and in offline modes as well

2.2.3 Some remarkable user functions

The improvement of the knowledge material management

In the system there is a function to define different content levels so called views, and with the help of these the learner has the opportunity to get to know the learning material in different levels according to actual needs – acquirement, repetition, thorough enquiry.

The enhancement of the ability to customize

One of the useful abilities of the system is the highlighting possibility in the text of the learning material; this function can be used in the same way as in the case of a printed text. This stressed text details are marked by the system.

The possibility of using notes

With the digital version of the manual notes used on papers we try to create a traditional learning environment. These notes – the same way as the stressed texts - are marked by the system.

The possibility of using bookmarks

The learner has the chance to place bookmarks in the text, that can be used later on.

Search

Students can search in the complete text.

Communication with the tutor

Students have the opportunity to communicate personally with the tutor via an internal message operator and publicly through the forum function.

Communications with other learners (personal and public), forum

Users have the opportunity to communicate personally with other learners with the help of an internal message operator and publicly through the forum function.

Adaptive tests

Through these tests the system gives the possibility to check the level of the acquirement of the learning material. These tests can be targeted as well.

Simulations

For the support of the knowledge acquirement simulated environment can be created in the learning material.

The variegation of the outputs

The appearance of the learning material is basically a web-based interface. The system was planned to operate online because only this way can be ensured the needed level of the interactions and the content consumption of the user can be easily followed up by the tutor. In general, the system can print the content appearing on the screen in a printer-friendly format. If requested, the learning material can be reproduced on CD-ROM or even in PDF format.

The collection of the customer's information in a structured way

The system collects detailed customer's information about the users/learners that can be analyzed on complex graphic interface, follow-up analysis is also possible.

3 Preparation work at the University

3.1 Decision on the starting course

Based upon a Feasibility Study including a detailed analysis of market demands and training specifications, the Transportation Engineering course has been chosen for the first implementation of our e-learning solution. This education area has great tradition in building transportation engineers and the University, has excellent knowledge and experiment in organizing the teaching process. In the first semester, nine subjects (Mathematics, Physics, Mechanics, ICT etc.) are to be elaborated taking part in e-learning studies.

Strategic decisions were controlled by a manager's board. Quality Management system had been introduced and a detailed development plan with milestones had been elaborated. Assuring the transparency of the development has been provided with intranet communication and work-flow management.

3.2 IT support

We have some expertise in presenting and accessing learning material via internet/intranet. We have realized that a reliable, robust and powerful computer network infrastructure is inevitable, so we have built an advanced Cisco solution for the on-line Internet/intranet access (see Fig.2.)

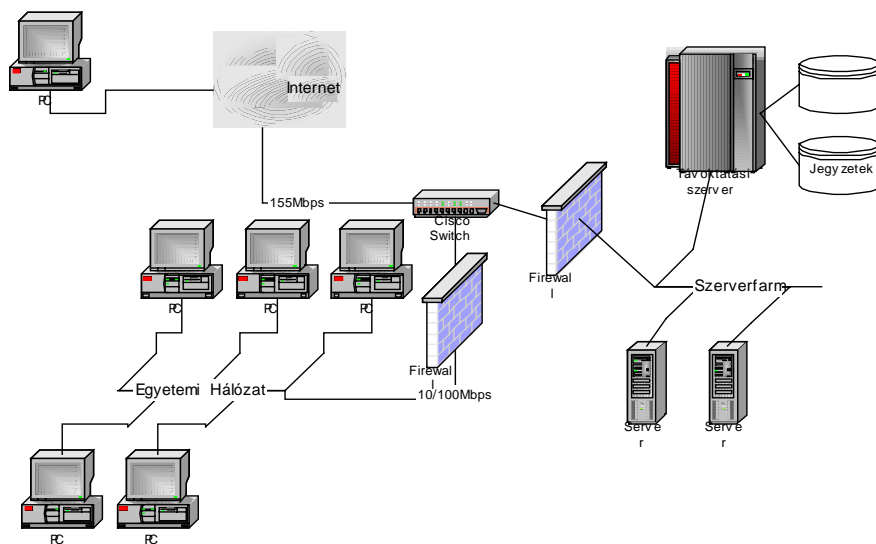


Figure 2. Campus network architecture

3.3 Initiating development of e-learning material

Relying on the methodological principles of the e-learning material development, we have started elaborating up-to-date learning material for the subjects involved in the first on-line semester. An E-learning Developing Team has been organized and for those, a Coedu training material development course was performed. According to our main development strategy, adaptation of existing learning material was preferred. We have decided that Multimedia should be applied, but technical level of average Hungarian internet clients has to be considered (“dial-up” internet connection is mostly used).

Required skills for the members of the Development Team had been declared:

- experience in higher education
- pedagogical and methodological knowledge
- experience in adult education
- skills in computer aided training
- good references.

The team should have a steady construction, and cumulate e-learning experiences. For the cooperation with the native team, advisors (technical and educational experts) had been appointed.

In a pilot project, two “e-subjects” have been developed: Technical drawing (Descriptive geometry) and Mechanics (Static analysis). As useful “side effect” dur-

ing the development is that there is a good occasion to go ahead in general teaching methodology, as well:

- more precise definition of professional requirements and learning objectives,
- improved description of student's "terminal behavior",
- elaboration of tests for self-control and evaluation (these often lack in the traditional courses).

We followed a two step development method

1. Writing "scenarios" and "scripts" based on books and lecture notes – by professionally and pedagogically highly trained experts (team members),
2. Developing e-learning ("electrical") material – Made in Coeditor – by computer operators and illustrators.

In between, a Dilemma has been conceived: "Should scenario-writing experts be trained in Authoring Systems (software for developing computerized learning material) like Coeditor?" We claim, principally not, but it is highly recommended. Further more, in the pilot project most of the colleagues agreed to do both scenario-writing and the e-learning implementation in Coeditor.

3.4 A key concept for organizing country-wide on-line studies

In the classical model of part-time ("distant") learning, students occasionally visit the University in order to take part in presentations and to pass exams. Practically, they travel from different places of the country to one center and this causes additional expenses.

In our "de-center" concept, regional centers equipped with the necessary IT infrastructure has been provided all around Hungary. Students may choose the nearest point in order to get on-line access, assistance, if needed. Exams can be passed only in the De-Centers, under control. Schedule is given in advance, illegal access from outside is impossible. (We introduce a Cisco SW key security solution.)

In building de-center network, we have been specifying the functional details, technical conditions and the operation practice for the regional e-learning centers. Requirements for local technical staff and computer infrastructure (PC clients, IE browser, internet connection, security and reliability, opening hours etc.) have been elaborated. We believe that outsourcing is economically more feasible than building an own infrastructure. A de-center can be an „e-Hungary" point, as well: is able to provide public services (internet-café, DVD-shop, meeting point, multimedia workshop, digital photo and hard-copy services etc.)

Conclusions

We hope that in our E-learning solution students will have lower additional expenses at higher learning efficiency (no travel, no day-off, university covers a part of the internet fees) and on the university side, outsourcing of de-centers and maintaining the existing IT infrastructure results in a lower budget.

We envisage that in the long run e-learning will make headway against postal courses and traditional distant learning in other courses at the University. Based upon our experience, e-learning will be introduced in the full-time classes, as well.

Furthermore, network and Internet will be faster and faster, access figures will soar dynamically, in that way, more and more real on-line learning interaction will be realized. That results in the evolution of a new controlling strategy of the learning process in Higher Education.

We believe that the spread and general availability of e-learning will promote the goals of post-gradual education and “life-long learning”.

References

- [1] Létray, Z. and Illés, T. Introducing COEDU e-learning system in Transporting Engineering education, Presentation and Q&A, EMEA Higher Education Summit, Intelligent Information Network Empowering Learning Environments, Budapest, 23-25 May, (2004).